

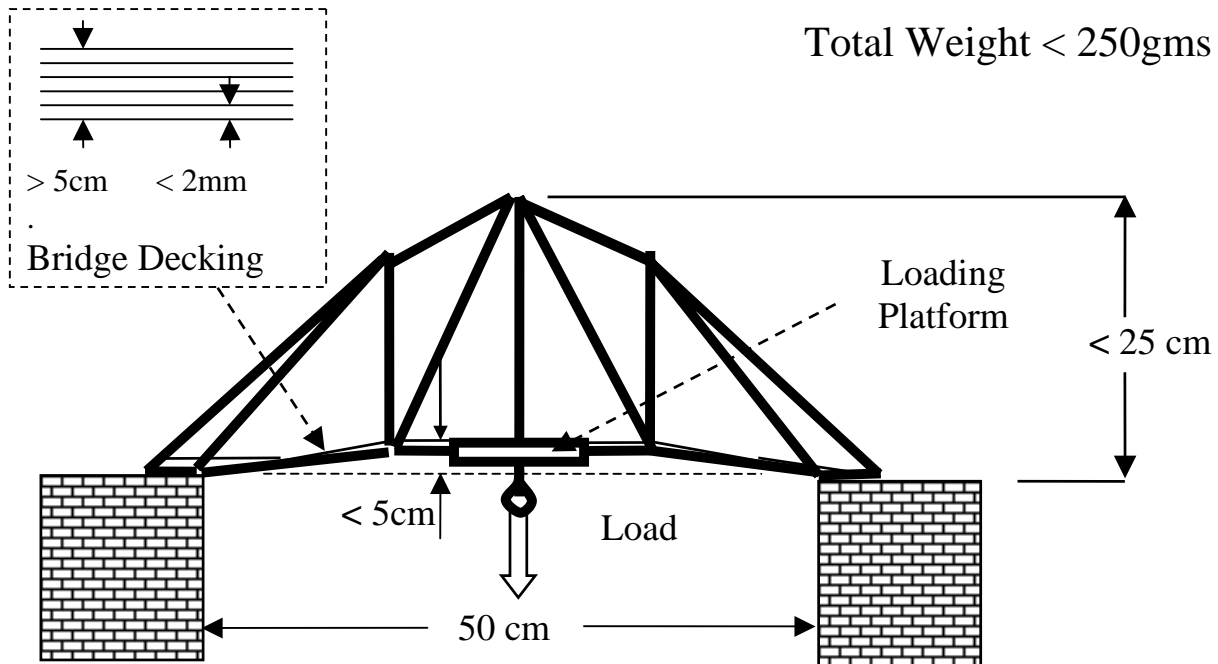
### **Mini Spaghetti-bridge project**

Each group is to build a bridge made from spaghetti and glue/epoxy. The object is to construct a bridge that will carry the heaviest load while still meeting specifications. Bridges will be loaded until they fail.

#### **RULES:**

1. The bridge is to be built from spaghetti (cylindrical forms of pasta) and glue, epoxy or resin.
2. The bridge shall be free-standing and must span two level surfaces which are a half-meter apart.
3. The support for the bridge shall be from the top of the level surfaces. The edges of the level surfaces cannot be used in any way for support.
4. The bridge must include a decking of spaghetti to provide a suitable road surface at least 5cm wide across the full span of the bridge. Three conditions must be met: a) gaps in the bridge deck are not to exceed 2 mm, b) a block of wood (5 cm x 5cm x 10 cm) representing a car must be able to move along the length of the decking unobstructed from end to end, c) the deck of the bridge must not be more than 5 cm above or below the ends of the bridge at any point along its length.
5. You must incorporate a "loading platform" consisting of an eye-bolt secured to a piece of plywood (0.7 cm x 5 cm x 10 cm). This platform is to be attached at the center of the bridge such that the bottom of the eye-bolt is no more than 5 cm from the top of the bridge decking. All loads will be suspended from this eye-bolt, and there must be a clear space directly below it to allow loads to be attached. Loads will be attached using an S-hook, and, if necessary, a 10 mm diameter metal rod extension. If during loading, the bridge twists in such a way as to cause the bridge to touch the rod at any point other than the eye-bolt, thus lending additional support, the bridge will be disqualified.
6. The maximum vertical depth of the bridge, from the highest point in its structure to the lowest cannot exceed 25 cm.
7. The maximum weight of the bridge including the loading platform must not exceed 250 grams.

## Bridge Schematic:



### PENALTIES:

1. Overweight:  $load_{net}(kg) = load(kg) \left( \frac{250}{bridge\ wt(gm)} \right)^4$

Note: bridge weight includes loading platform, but not eyebolt.

2. Too high:  $load_{net}(kg) = load(kg) \left( \frac{25}{bridge\ ht(cm)} \right)^2$

3. Improper decking and/or car won't pass:  $load_{net}(kg) = load(kg) - 2$ .

4. Bridge supported by edges or sides of support: *disqualified*.